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Berkeley, California

March 2, 1942

To: F. C. Craighead, In Charge, Forest Insect Investigations

From: R. C. Hall, Acting in Charge, Berkeley Laboratory

Subject: A Preliminary Report on Treatment for the Control of the California Pine Scale

We are enclosing a copy of a preliminary report by McKenzie on "Treatment for the Control of the California Pine Scale, Nuculaspis californica (Coleman), Infesting Ponderosa Pine."

This represents the results of spray tests at Hat Creek during the early summer of 1941. You may note that test No. 4, using cubé resins dissolved in Cardolite gave excellent results in controlling this needle scale with no apparent injury to the tree. If funds are available for further work it is planned to test this formula again this spring in the Crestline area of San Bernardino County. This is an area where this insect is particularly abundant and has been apparently doing considerable damage to ponderosa pine in recreational areas. In any event the formula will be again tested at Hat Creek to further its effectiveness.

R C Hall

Enclosure

RMNR 344
1472 ✓

A PRELIMINARY REPORT ON TREATMENT FOR THE CONTROL OF THE CALIFORNIA PINE SCALE, NUCULASPIS CALIFORNICA (COLEMAN), INFESTING PONDEROSA PINE

The California pine scale, Nuculaspis californica (Coleman), has for the past few years been causing serious defoliation of ponderosa pine in several forested areas in California. In the recreational area of Crestline in San Bernardino County, it has caused considerable concern since its activities in this region appear to have caused much tree decadence, and many of these trees have been subsequently attacked and killed by bark beetles. Many of the killed trees have served as shade for cabins and residences in the city of Crestline. It has, therefore, been deemed advisable to apply treatment for the control of this scale insect. Generally speaking, spraying in the forests for the control of a scale insect has not been recommended simply because of the expense involved; however, in the case of recreational and residential centers the situation is quite different and the application of spray materials may be entirely practicable.

Little or nothing is known as to what kind of treatment is best to control this insect, or what the tolerance of pine trees is to various kinds of sprays. During the past season, however, an infestation of this insect near the Hat Creek Laboratory of the Bureau of Entomology and Plant Quarantine in Shasta County, presented an opportunity to test the effect of certain spray formulae on this pest on ponderosa pine. The insecticides used were prepared and supplied by Dr. A. M. Boyce of the University of California, Citrus Experiment Station at Riverside, California. Dr. Boyce has furnished many valuable suggestions regarding this problem and to him the writer is indeed grateful.

The sprays were applied to young trees on July 12, 1941. The first treatment was applied at 9:45 a.m. at which time the air temperature was 77° F. and the relative humidity 26 percent. The last treatment (test No. 5) was applied between 11:15 and 11:30 a.m. at which time the air temperature was 85° F. and the relative humidity 28 percent. Observations on the sprayed trees were made on July 15 and 24, and on October 21, 1941. Scale counts were made on July 31 and August 1, 1941. The results of these tests are presented in Table 1.

The most striking results of these tests are the apparent toxicity of the cubé resins dissolved in Cardolite, and used in a light medium oil, to the California pine scale. As indicated in Table 1, no needle burn or injury of any nature was noted on trees examined three months after treatment with this insecticide. It seems advisable, however, to wait until next spring before final judgment is made regarding tree injury, because of the possibility that the appearance of damage may be delayed.

Further tests with this formula are recommended in the Crestline area of San Bernardino County during the 1942 spring season, providing additional funds may be made available for such work. Spray experiments in this region should be carried on in a preliminary manner until it has been definitely established that this insecticide is effective and safe to use in this part of California.

Literature Consulted

Boyce, A. M., Kagy, J. F., Persing, C. O., and Hansen, J. W. 1939. Studies with Dinitro-o-cyclohexylphenol. Jour. Econ. Ent. Vol. 32, No. 3. pp. 432-450.

Kagy, J. F. and Boyce, A. M. 1941. Solubilizers for petroleum oils and extracts of rotenone-bearing roots. Jour. Econ. Ent. Vol. 34, No. 6, pp 804-811.

Respectfully submitted,

H. L. McKenzie
Assistant Entomologist

Berkeley, California
February 25, 1942

Table 1. Spray Mixtures Used to Control the California Pine Scale, Nuculaspis californica (Coleman), Infesting Needles of Ponderosa Pine

Test No.	Spray Ingredients per 100 gallons Water Mixture	No. Trees Used	Number Scales Counted	Estimated Natural Scale Mortality[1]	Percent Killed by Spray	Tree Injury
1	Highly refined petroleum oil #3 (light medium), 2 gal. Blood albumin spreader, 4 oz. Dinitro-ortho-cyclohexylphenol, 2.24 oz.	4	No counts made because of:			Severe needle burn
2	Highly refined petroleum oil #3 (light medium), 2 gal. Blood albumin spreader, 4 oz. 3-5-dinitro-ortho-cresol, 2.24 oz.	4	626	150	99	Slight needle burn
3	Triethanolamine salt of dinitro-o-cyclohexylphenol, ½ lb. Spreading agent composed of para tertiary butyl phenoxyethanol dispersed in bentonite, 1½ lb.	4	1,072	257	69	No tree injury
4	Highly refined petroleum oil #3 (light medium), 2 gal. Blood albumin spreader, 4 oz. Toxic solution - cube resins dissolved in cardolite[2] (contains 16% cube resins, which resins contain 30% rotenone), 1 pt.	4	1,200	288	100	do.
5	Kerosene, 2 gal. Blood albumin spreader, 4 oz. Toxic solution (same as given in Test 4)[2], 1 pt.	5	995	238	42	do.
6	Unsprayed trees used as checks	4	689	167	--	--

1. Based on counts on the 4 check trees which showed a 24 percent natural mortality in field.
2. The toxic solution was added to the oil or the kerosene before being put into the tank.